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AND

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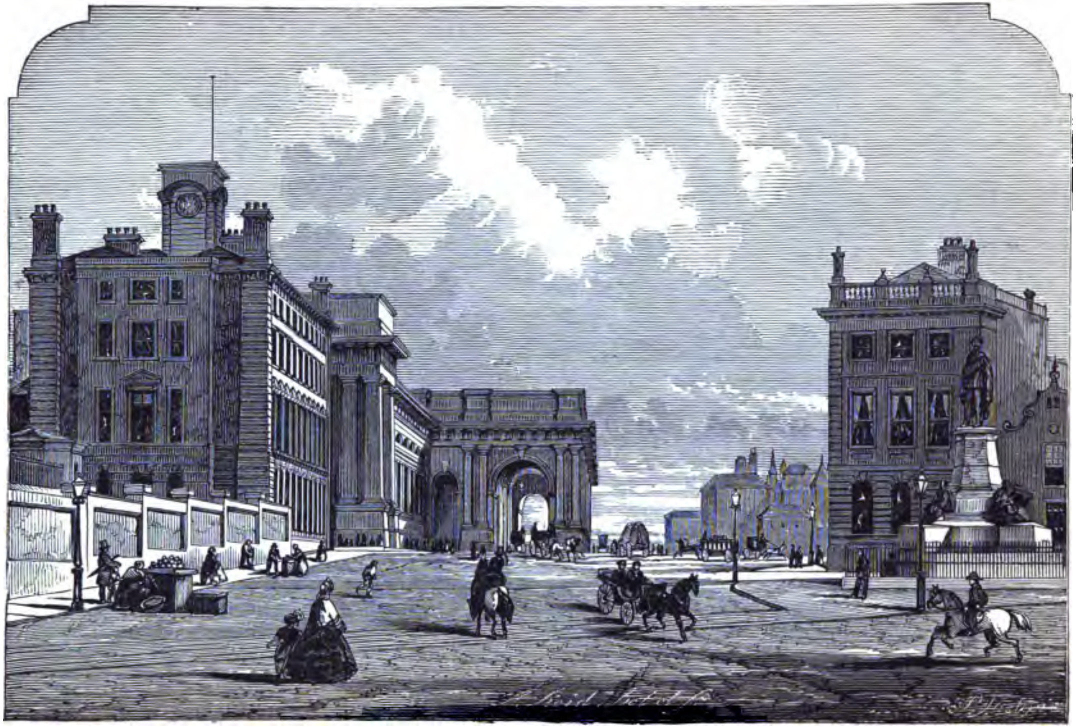

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GEORGE STEPHENSON

AND THE

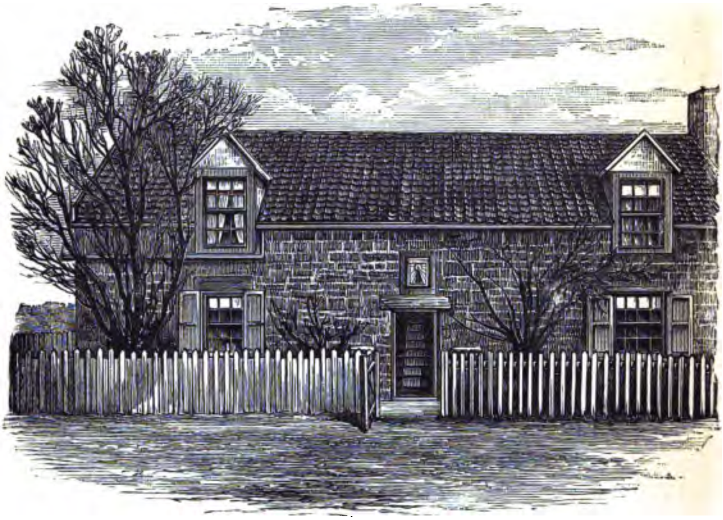
Progress of Railway Enterprise.

IN view of the approaching Centenary of George Stephenson, a lecture on the above subject was delivered in the Central Hall, Newcastle-upon-Tyne, on Thursday evening, December 2nd, 1880, by Mr. Charles MacNay, of Newcastle. The Sheriff of Newcastle (Thomas Richardson, Esq.) occupied the chair, and briefly introduced the lecturer as a son of the late Mr. Thomas MacNay, who was for many years General Manager and Secretary of the Stockton and Darlington Railway.

Mr. MacNay said:—Newcastle will ever be justly and deservedly proud of the names of George and Robert Stephenson, and it is so closely identified with the early history of the Railway system, that I think it well to cherish in our midst the memories of those men, whose names will always be associated with the commencement of that gigantic enterprise which has done so much to enhance the great social, commercial, and political interests of a country whose flag is honoured on every sea, whose commerce is carried to every land. I believe nothing has done more towards bringing about that pre-eminence in commercial greatness of which we so justly and so proudly boast, or done more towards elevating us as a nation above all the other trading communities in the world, than the development of those grand arterial highways, the first page of whose history was written when No. 1 engine first travelled from Brusselton Bank Foot to Stockton-upon-Tees, a history that will never be completed until the innumerable benefits and advantages which we now enjoy are being realised by all the nations of the earth. I have the pleasure of knowing some of those who were present on that memorable occasion, but long after they, and many of us much younger in years and less burdened with care have passed into the silent land, will that history be traced back, like a mighty river is traced from its confluence with the ocean to its source, until, I may say, within a very short distance of the building in which we are assembled together to-night will be recognised the place from whence emanated that great and wonderful enterprise which has done so much to increase our national wealth and improve our social condition. In the quiet and secluded village of Wylam, in a lonely, humble, and isolated cot, which I visited a short time ago, we identify the birth-place of George Stephenson, the colliery boy, who has made the world his debtor, and made himself the benefactor, not only of individuals, but of nations. He was born on the 9th of June, 1781, about the time when Lord Cornwallis was shut up in Yorktown by Washington, and the American Colonies were finally severed from the British Empire. His first employment was that of a herd-boy at twopence a day. But we will leave him during his earlier days attending the cows on Widow Ainslie's farm, birdnesting, and modelling his clay engines by the side of Dewley Burn. His highest ambition was to be taken on at the colliery, and his parents

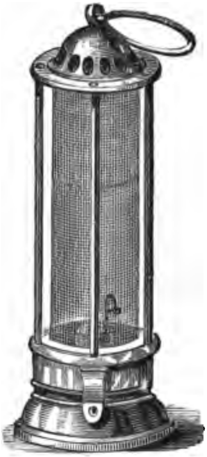
Birth-place of George Stephenson, Wylam-on-Tyne.

being poor, we soon find him accompanying his father thither, where he started work as a "picker," to clear the coals of stones and dross at sixpence a day. Shortly afterwards he was engaged to drive the "gin" at Black Callerton Colliery, and at fourteen years of age he was appointed assistant fireman to his father at Dewley. He was eighteen years of age before he learnt to read, but there were no Board Schools in those days, and the disadvantages under which he laboured, the many difficulties he had to contend with, and the dearth of means, all tend to increase the credit due to him for the indomitable perseverance and determination with which he accomplished that task. This undauntedness was the characteristic feature of his life; it showed itself conspicuously in the persistent manner in which he so frequently was found taking his engine to pieces for the purpose of examining it and mastering its details. It also showed itself in another and very different form in the commendable way in which, when pressed to it, he fought and vanquished Ned Nelson, the colliery bully, at Black Callerton. Nelson left his work for a whole week to go into training, whilst Stephenson continued at his work as usual until the evening of the day appointed for meeting his challenger, when he very coolly and unconcernedly gave him a thrashing which he justly deserved, and no doubt afterwards profited by. On the 28th of November, 1802, he was married in Newburn Church, to Fanny Henderson, to whom he was devotedly attached. I have been in the church, have examined the Parish register, and seen both their signatures. For some information relating to other incidents in the early career of Stephenson, I am personally indebted to our esteemed and learned townsman, the Rev. J. Collingwood Bruce, LL.D. Whilst living at Willington Quay, and working as brakesman at the Ballast Hills, his only son Robert was born on the 6th of November, 1803. The Stephenson Memorial Schools are now erected upon the site where the house stood, and I have been afforded an opportunity of looking through these schools and been privileged to examine a very neat model of the house in which George Stephenson lived and spent a deal of his spare time in futile efforts to discover perpetual motion. Doubtless the efforts made in this direction, though unsuccessful in attaining the object desired, contributed in no small degree to mould and develop and strengthen his natural mechanical genius. He astonished the pitmen by attaching an alarum to the clock of the watchman whose duty it was to call them early to their work in the mornings, and gained the favour of the women by connecting the cradle with the smoke-jack and making it self-acting. He also invented a lamp that would burn under water, it being supplied with air by means of a tube from the surface. He occasionally amused his friends by taking this lamp into the fish-pond at Gosforth at night, and the fish being quickly attracted by the subaqueous illumination soon afforded considerable sport. Two years after the birth of his son his wife died, and he thus sustained a loss which weighed heavily upon him. He soon afterwards accepted the care of an engine at Montrose, and at this time he also had a strong desire to emigrate to America, but fortunately for this country he was too poor to satisfy his longing to go abroad. He performed the journey to Montrose and back on foot. On his return he was drafted into the militia, and nearly all the money he had earned was spent in procuring a substitute. It was only whilst acting as brakesman at the West Moor Colliery, Killingworth, that his superiority as a workman became known, and his abilities as an engineer recognised. A new pit was being sunk in the neighbourhood called the High Pit, and after the works had proceeded for some time, all further progress was stopped by the men being drowned



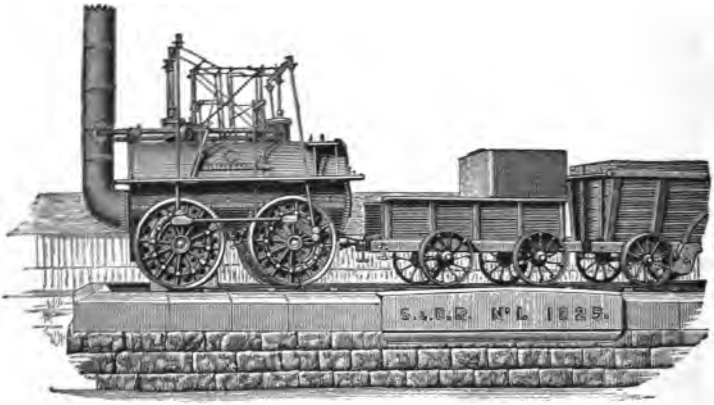
George Stephenson's Cottage at Killingworth, near Newcastle.

out. After altering the engine at this pit so as to make it pump up the water, which had hitherto prevented the men from working, and entailed upon the owners great expense and loss, he was appointed enginewright, and his fame soon began to spread abroad. It was here that he in conjunction with his son Robert made the sun-dial which he always took such great pride in pointing out to visitors. I saw it a few days ago; it still stands over the cottage door where he lived whilst working at Killingworth. In this cottage Stephenson invented the "Geordie" safety-lamp, so valued by the colliers in the North, and under the same roof he designed the locomotive which has revolutionised the world. The house stands not far from the main line going North, and passengers may easily see it from the train as they pass by. He was a man of noble stature and Herculean strength, possessed of a vigorous intellect, with original and expansive ideas. He at once recognised the great advantages accruing from a sound education, and soon determined that his son Robert should not feel the same want which he had done, and accordingly appropriated what he could spare from his hard earnings at the colliery, together with what little he made in the evenings by mending shoes and repairing his neighbours' clocks and watches, to the education of



The "Geordie" Safety-lamp.

his son, in order that he might not feel at the same disadvantage with his contemporaries that he felt he had been himself. He was never idle, but by close attention and keen observation constantly and assiduously applied himself to acquire a knowledge of mechanics and facts which formed the substratum of that power which enabled him so successfully to grapple with more important and momentous undertakings in after life. During the time Napoleon with his army was over-running Italy, and by his numerous and brilliant victories exciting the enthusiasm of France and astounding the whole of Europe, whilst Nelson was proving the prowess of our navy on the seas, and Moore and Wellington were asserting the supremacy of our arms in the field, young Stephenson was quietly working and preparing to embark in a new enterprise, destined to overrun the world with good, and to prove even more powerful than the sword in spreading civilisation, more potent than despotism in effecting reforms. Already numerous attempts had been made by various persons to adapt the steam engine for purposes of locomotion, but each singularly failed until the inventive genius of George Stephenson showed itself in a locomotive which he built at the West Moor Colliery, and placed on the railway at Killingworth on the 27th of July, 1814. It, however, worked but indifferently until the application of the steam blast doubled its power of hauling and effected considerable saving in the cost of working. It was at this time that the fate of the locomotive was decided and its supremacy over horse-power established, though there was yet much room for improvement, and the inventor continued to watch its working with eager anxiety, which resulted in each one he constructed being marked by improvement in design and an increment of power. He also made frequent experiments in estimating the resistance by friction and gravitation which the engine with its load had to overcome, and was induced to alter the laying of the rails and the construction of the wheels so as to diminish it as much as possible and attain a far greater speed. Though there was still a prejudice against the adoption of the locomotive, it continued to work successfully and economically, and it is a strange fact that eight years elapsed before the construction of another railway for the transit of coal, and that was the Hetton Railway, about eight miles in length, which was opened amidst great rejoicings on the 18th of November, 1822. It was constructed under the superintendence of Stephenson, and intended to carry the coals from that rich colliery to the staithes on the Wear, near to Sunderland. No doubt some important improvements in the locomotive must always be associated with the name of Timothy Hackworth, who was a natural and true mechanic of undoubted inventive genius, to whom the world is perhaps more indebted, and owes more gratitude and honour than has often been ascribed to him. He was truly one of the pioneers of the railway locomotive, one of those who had to battle in comparative darkness, unaided by experience and unassisted by the light which science and mechanical knowledge have since spread abroad. The importance of finding a new and more extensive market for the disposal of the coal from the collieries in the South Durham coal-fields, near to Bishop Auckland, had for a long time been engaging the serious attention of certain gentlemen in that district. Some advocated making a canal from the river Gaunless, at Evenwood, near West Auckland, to the river Tees, below Stockton. The objections to this scheme were manifold, the levels required for the locks necessitated a much longer route, and doubtless the difficulty of working them during the severe frosts in winter was not amongst the least of the objections set forth by its opponents; whilst the immense difference in expense was greatly in favour of the construction of a railway or tramroad. Foremost amongst those in favour of a railway was Mr. Edward Pease, of Darlington. Through his perseverence and influence with his friends and relations a company was formed, the preliminary surveys made, and an application made to Parliament for an Act to sanction the laying of a tramroad between Witton Park and Stockton. This Act was however lost, chiefly through the influential opposition of the Duke of Cleveland, Earl of Darlington, owing to the proximity of the projected line to one of his fox covers. Another Session was lost through the death of George the Third whilst Parliament was assembled in 1820. But the promoters of this line were men of a character not easily to give in or succumb to the first defeat, and accordingly to Parliament they went again, their efforts were this time rewarded with success, the Bill passed, and the Royal Assent was given to the Stockton and Darlington Railway, the first public railway in the world, on the 19th of April, 1821. The opposition both in and out of Parliament was powerful and varied, and not without effect in increasing the difficulties and retarding and delaying the object of the promoters. A little time after the passing of this Act George Stephenson, in company with his friend Nicholas Wood, called on Mr. Edward Pease in Darlington, and offered his services in constructing the new line. So pleased was Mr. Pease with his appearance and outspoken manner, and so favourably did the two impress him with their account of the working of the locomotive at Killingworth, that he undertook to bring his application before the directors; and so ably did he support it that George Stephenson was appointed engineer to the Company and requested to report as early as possible as to any improvement in the levels or deviation in the route which he might have to suggest. There was yet another important question to decide, and that was the kind of tractive power to be used in working the line. Mr. Pease was already favourably disposed towards the adoption of the locomotive, but in order to satisfy himself more thoroughly on this subject he determined to visit Killingworth and see it working. He accordingly did so in 1822, and there saw the engine hauling its heavy loads with apparent ease. He was at once satisfied with its achievements, and agreed that it was the best and easiest method of conveying heavy loads from one place to another, and he pleaded its merits with such admirable tact that it was decided to give it a fair trial, and the second Act for the Stockton and Darlington Railway, obtained in 1823, contained a clause empowering the use of locomotive engines for the conveyance of passengers as well as merchandise. Soon after his appointment as chief engineer George Stephenson removed from Killingworth to Darlington, and at once proceeded in a business-like manner to make the line, with his son Robert and John Dixon as his assistants. With occasional opposition, and after numerous obstacles were overcome, and many difficulties surmounted, it was at length satisfactorily completed; and amidst the prejudice of its opponents, the great anxiety and eager expectation of its supporters, and with becoming stir and rejoicing on the part of those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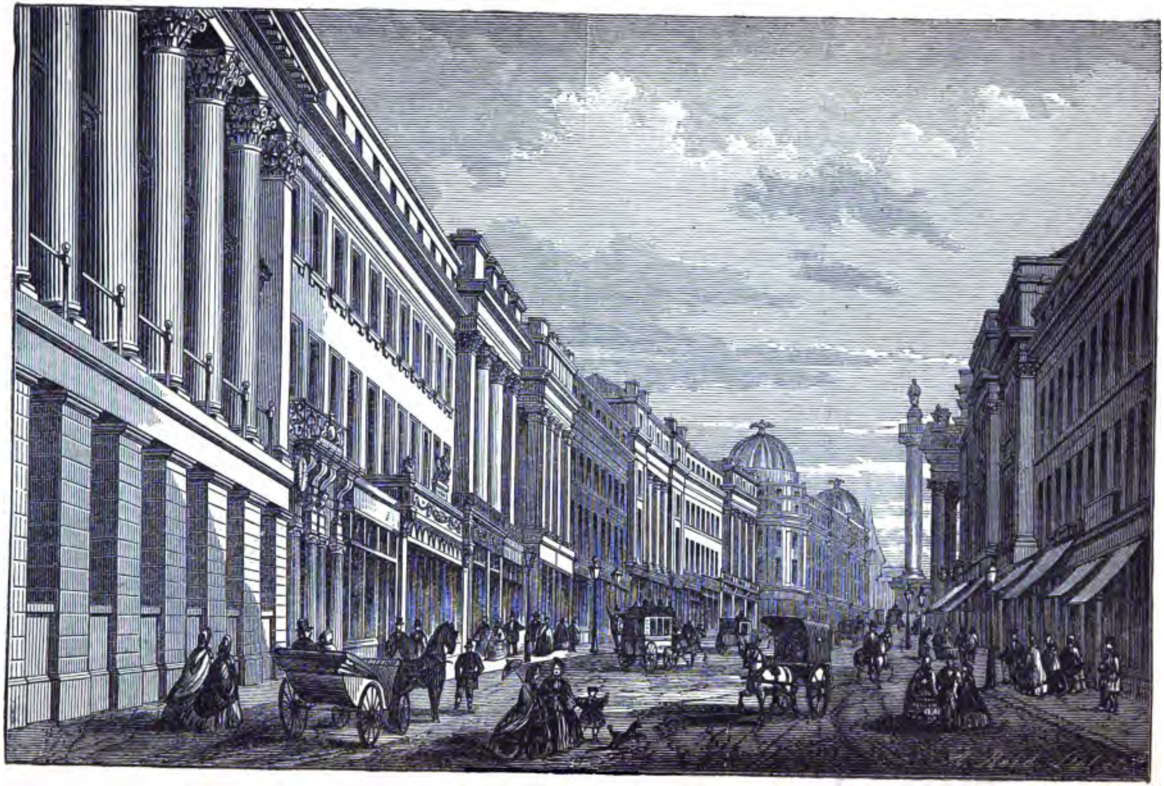
The first Locomotive Engine that ever pulled a passenger train.

interested, was duly opened for public traffic on the 27th of September, 1825. That day marks an epoch in the history of our country from which to date future events. Only the other day the *Newcastle Chronicle* informed us that the North-Eastern system had swallowed the "venerable link," but I doubt very much whether it has yet digested it; its name still lives, and continues to rise up perceptibly before us in assurance that it is dear to and cherished by those living in the district through which it passes. The incidents relating to the construction, opening, and early working of the pioneer lines, the Stockton and Darlington, and the Liverpool and Manchester, form subject sufficient for a separate lecture, and it is not my wish to-night to repeat their detailed history but rather to trace the progress of the system. I, however, consider that Darlington has a special claim to my notice, it was there that the ball of this progress was first set in motion, and it proudly lays claim to, is justly designated, and generally known and recognised as the birthplace of railways. With equal justice is the name of Mr. Edward Pease known as the father of railways; his manly form and thoughtful demeanour were familiar to my boyhood, and I have a very vivid recollection of watching the funeral *cortége* bearing his remains to their last resting place in the quiet burial ground behind the Friends' Meeting House in that town. Most respectfully do I mention the name of his son, the late Mr. Joseph Pease, as the first railway treasurer, then equally enthusiastic with his father in working for the

Newcastle in the Days of George Stephenson. A tablet marks the house in Eldon Street where George and Robert Stephenson lived in 1824-5.

success and future prosperity of the railway. Mr. Jonathan Backhouse, of Darlington, was the first railway banker, and Mr. Thomas Meynell, of Yarm, was the first railway chairman. Mr. Francis Mewburn, a native of Newcastle, though resident in Darlington, was the first railway Parliamentary solicitor; and his was no envious office, with no previous rulings to guide him, no precedents to which to refer. All of these, together with others also gone to their rest, were men who worked hard and unceasingly, and not altogether unsuccessfully, to leave the world somewhat better than they found it. In the quiet burial grounds at Darlington there lies more of the dust of the Railway Pioneers than in any other place on the face of the globe. Darlington must ever be prominently chronicled in the page of railway history, and the honoured name of Pease, as well as Stephenson, will always be interwoven with the early records of that marvellous enterprise which they so fondly fostered and worthily helped to mature. May she long continue to be proud of her position, and hand down to posterity, gilded on her escutcheon, and defended by truth, the names of those men who bore the heat and burden of the day during the many vicissitudes which beset the railways when struggling into existence. The Liverpool and Manchester was the next public railway that was made. Constant delays in the transport of goods and consequent interruption to trade, had awakened the manufacturers of Manchester, and the merchants of Liverpool, to the necessity and importance of seeking increased and improved means of communication between those two thriving towns. Though the opposition was even fiercer than in the case of the Stockton and Darlington line, the projectors eventually succeeded in carrying a Bill through Parliament, and the works were undertaken by Mr. Stephenson. One of the most prominent and interesting amongst them being the difficulty of carrying the line over Chat Moss, a treacherous floating bog about four miles in length and thirty-five feet in depth. It was on a section of the line under the care of his assistant, Mr. John Dixon, who afterwards became consulting engineer to the Stockton and Darlington Company, and to whose humourous and instructive anecdotes it has often been my privilege and pleasure to listen. The tunnel at the Liverpool end, and the viaduct over the Sankey Valley, were also formidable undertakings in that day. The works were all satisfactorily completed, and the railway was opened with great *eclât* on the 15th of September, 1830, a day unfortunately marred by the melancholy accident resulting in the death of Mr. Huskisson, one of the principal promoters of the line. In Parliament Stephenson was ridiculed, abused, and insulted both by counsel and committee; and his sanity was openly questioned. On the ground he was threatened and even molested, and at times his work was actually stopped by the prejudiced populace, and it was only by stratagems suggested by the undaunted courage and characteristic determination of the man that he was enabled to complete his survey, portions of which had to be done by aid of a lamp during the night. I have heard the late Mr. Dixon speak with pride of the success which attended this emprise. During the construction of this line a large number of the directors were in favour of working it with stationary engines, and strenuously opposed the adoption of the locomotive, and when Stephenson thought the great scheme of his life about to be crushed, he observed to his son—"Matter gives me no trouble; I can bend it to my purpose; it is mind which is my great difficulty—I cannot engineer that." Yet he afterwards succeeded in overcoming this difficulty, and the universe now yields to his early conviction of the future supremacy of the locomotive. Prior to the opening of this railway all the heavy goods were conveyed between Liverpool and Manchester by means of three canals, and the passengers by ordinary stage coaches. The capabilities of the locomotive became more and more apparent as the prejudice which it at first evoked disappeared, and its utility and superiority as a motive power were obvious to the most indifferent and casual observer. Railways became in great demand, and even the most sanguine expectations of Stephenson were soon more than realised. All our principal manufacturing and seaport towns became connected by these iron roads; the North was joined to the South, and the East exchanged commodities with the West. They now spread like a vast network over the whole of our island. They have given an impetus to trade and a stimulus to commerce, they have increased our shipping and extended



Modern Newcastle.—Grey Street.

our docks, they have multiplied the number of our collieries and brought into requisition vast numbers of rolling mills and iron furnaces, they have raised up towns and created new works, they have opened out our mines and our quarries, they have brought the manufacturer into closer communication with the merchant, they save time and thereby make money, they have benefitted the agriculturist and enhanced the value of the land whose owners first opposed them, they assist us in war and they help to preserve peace, they have improved our postal arrangements and developed our telegraph system, they give employment to hundreds of thousands, and they benefit millions. Amongst the numerous lines that were subsequently made, some of the largest and most formidable, numbering about 700 miles in extent, were constructed by George and Robert Stephenson, the principal ones being the London and Birmingham; the Manchester and Leeds; the North Midland from Derby to Leeds; the York and North Midland from Normanton to York; the Trent Valley; the Chester and Holyhead; the Whitby and Pickering; the Chester and Birkenhead; the Maryport and Carlisle; the Newcastle and Darlington; and the Newcastle and Berwick. They both became eminent engineers, were much sought after, undertook heavy responsibilities, and amassed considerable fortunes. *Labor omnia vincit* was undoubtedly and unmistakably the insignia inscribed on their banner, and their works most gracefully illustrate and faithfully prove the truthfulness of the motto. Mr. George Stephenson was consulted in laying out the Belgian railways; he was interviewed by the King, and made Knight of the Order of Leopold in 1835; a similar honour was conferred upon his son in 1844. "See'st thou a man diligent in his business, he shall stand before kings." In 1845 he was engaged to report as to the feasibilty of the proposed "Royal North of Spain Railway" from Madrid to the ports in the Bay of Biscay, Corunna, Ferrol, and Bilbao, but his report being unfavourable to the scheme it was ultimately abandoned. When engaged with his survey amongst the Spanish mountains, he suffered hardships and caught cold, and whilst hastening to England he was seized with an illness which severely shook his already over-taxed constitution. Mr. Stephenson was never ashamed of his humble origin. When on a visit to the North many years after he had won his laurels and raised himself to affluence, he one day observed to a friend, "I've been to Callerton and I've seen the fields in which I used to pull turnips for twopence a day, and many a cold finger I can tell you I had." Upright and just in all his undertakings, his every action betokened greatness. He was noble both in thought and deed. He was of a mild and genial disposition, with a cheerful countenance and pleasing manner; generous, free, and open-hearted, with ever a kind word for those employed under him, all of whom readily recognised and acknowledged his great power to control and direct them. Homely in habit and affectionate in disposition, he always gave kind advice to those who needed it, and always had a cheering word of encouragement for those in trouble; though he never failed to bestow blame or praise where due. By his kind words, and still kinder actions, he won the hearts of all; and was esteemed and respected alike by high and low. No man deserved more, or sought less honour than he. The strong love for birds and animals evinced in his youth never forsook him, and latterly he took great pride and interest in the study and pursuit of horticulture. He took a lively interest in promoting and supporting mechanics' institutes, an interest no doubt stimulated and intensified by recollections of the great need he had felt for similar institutions during his early struggles to feed his insatiable longing for knowledge. He was several times offered knighthood by Sir Robert Peel, which he always modestly refused. He lived to see the railways become the King's Highway, as he prophesied they would do, and died at his residence, Tapton House, on the 12th of August, 1848. He is buried in Trinity Church, Chesterfield. The mantle of grief thrown over his remains was covered with the honours of a grateful and admiring people. The 9th of June next will be the centenary of his birth, when, doubtless, due honour and respect will be paid to the memory of a great man, whose reputation needs no euology, the benefits of whose genius we all enjoy, and the fruits of whose labours are daily increasing and extending.

His name is writ on history's page,
And age shall proudly tell to age,
The triumphs that he won.

Of his son Mr. Robert Stephenson's colossal works some of the most important are the Border Viaduct over the river Tweed at Berwick; the Conway and Britannia Tubular Bridges over the Menai Straits; the Victoria Tubular Bridge, about two miles in length, through which I have often crossed the St. Lawrence River at Montreal; and certainly, not least, his conception and design of that masterly and massive structure, the High Level Bridge at Newcastle-upon-Tyne. These I consider to be more fitting, more useful, more lasting and appropriate monuments of his skill than either the chisel of the sculptor or the pencil of the artist could possibly produce. He also constructed the railway between Alexandria and Cairo, in Egypt, 140 miles in length, and on which there are many

High Level Bridge, Newcastle-upon-Tyne.

engineering works of the most difficult character, including two tubular bridges, one over a branch of the Nile at Benha, and the other crossing a very large canal at Birket el Sabre. The main line is intersected by the Nile, on which he constructed the largest steam ferry in the world, by means of which the entire train was carried across the river. This ferry is now superseded by a bridge designed by Mr. Robert Stephenson, in which there is the largest swing bridge ever built. Since the unfortunate and melancholy collapse of the Tay Bridge, the Victoria one at Montreal may be considered the longest viaduct in the world. Its design and construction were rendered more difficult by the great resistance it has to present to the immense quantities of ice coming down the St. Lawrence river every spring from Lake Ontario. I have sometimes seen these huge blocks of ice about four feet in thickness, piled up 50 and 60 feet high, and it is not very easy to estimate the strength of a structure required to resist such a pressure in a current about two miles broad, and running from 12 to 16 miles an hour. On the completion of the Newcastle and Berwick line, Robert Stephenson was offered knighthood by Earl Grey, but politely declined the honour. He was President of the Institute of Civil Engineers, London, during the years 1856 and 1857. He was an M.A. of Durham, and D.C.L. at Oxford. He became M.P. for Whitby in 1847, and held the seat in the Conservative interest until the time of his death. He died in London, a comparatively young man, on the 12th of

October, 1859. His country learnt and acknowledged his great worth, and he now sleeps amongst the illustrious of England's dead within the sacred precincts of Westminster Abbey. The sterling qualities of the father were mirrored in the character and career of the son, and are reflected in the pages which record the history of both. As regards men of business the old stage coach has long since sunk into desuetude, though, perhaps, to the followers of Mr. Ruskin, to pleasure seekers, and those to whose energies the world is in no way indebted for any advancement, improvement, or benefit, it may possibly yet be a preferable mode of conveyance. By our improved mode of travelling we are freed from the dangers of the highwayman, and are protected from the inclemency of the weather; we are enabled to journey much greater distances in considerably less time; we can admire a far greater extent of country, and are afforded more frequent opportunities of change of air. Thus we gain health, enjoyment, comfort, and time. The primitive-looking engine, with its top gear, built at Killingworth in 1814, is now superseded by the majestic-looking machine so familiar to us to-day. A locomotive with its tender then weighed only 10 tons; some of our more modern ones weigh as much as 80 tons. It was then feared the locomotive could not be built powerful enough to draw a load up an incline of 1 in 300—they now haul heavy loads up a gradient of 1 in 30. The rails in that day were "fish-bellied," and weighed only 28 lbs. per yard; they are now double-headed, and weigh about 85 lbs. per yard, and steel ones are as quickly superseding iron ones as iron superseded wood. The original gauge of 4 feet 8½ inches is uniformly adopted on all the important lines in this country, though it varies in others. The gauge of railways in Ireland is 5 feet 3 inches; in India it is 5 feet 6 inches, and in America it varies from 4 feet 8½ inches to 6 feet. The gauge of railways on the Continent is mostly the same as the English railways, only the Spanish gauge being 5 feet 6 inches, creates a break with the French railways, perhaps of political importance and significance, though commercially inconvenient. The timidly allotted rate of 8 miles an hour in 1825 is eclipsed by the lightning-like speed we now travel—60 miles an hour. Instead of occupying twelve days in travelling between Edinburgh and London, honourable members of Parliament may to-day breakfast with comfort in Edinburgh, or even further North, and the same evening take part in the debate in the House of Commons. Tiberius is said to have travelled 200 miles in two days, and thus caused consternation. To-day we can travel more than half that distance in as many hours. Some of our swiftest engines are on the North-Eastern, the Great Northern, and the London and North-Western lines, and the heaviest ones are on the North-British Railway. Before we can look for increased speed in this country, where railways are becoming so perfected and traffic is so rife, I think one of the most important questions that will have to occupy the attention of our engineers is the duplicating of the trunk lines, in order that the passenger and merchandise traffic may be worked upon independent roads, thus reducing the danger of collision and securing far greater safety to life. Of our modern railways I think the most wonderful and difficult to construct are our Metropolitan underground lines. The ingenuity displayed in avoiding the sewers, the myriads of gas-pipes and water-pipes, and preserving the foundations of existing buildings, at the same time maintaining the necessary levels for the stations, is amazing, and worthy of all praise. There are at present 30 miles of this system of railways annually circulating about 64,000,000 passengers in and around London. By the progress of railway enterprise we may estimate the advancement of all our social and commercial reforms. In order to facilitate this advancement many of the bands of red-tape-ism which restrict the executive might be cut asunder, and not a few of the awe-inspiring airs of office be dispensed with. Those who cloak themselves with too great austerity and frigid unapproachableness, and wear only the habiliments of pageantry and pride, might perhaps do better were they to emulate a little of the thoroughness, the less assuming, more considerate, and vastly superior mein of the great founder of the railway system. The paramount care of railway officials is the safety of life; next the exercise of a judicious expenditure and the display of a generous tariff, betokening an absence of parsimony, and evincing an anxious desire not merely to increase dividends but to extend the area of usefulness, expand the sphere of their operations, and promptly meet the continually increasing and constantly fluctuating requirements of the public. Consistently with the interests of the proprietors, a more liberal regard for the small comforts and general welfare of the numerous employés who assist to earn their handsome dividends, might prove a gain to both. It is an almost incredible fact that there are to-day no fewer than 300 railway corporations in England alone, though many of the smaller ones being leased and worked by the larger ones reduces the number of really working companies to about sixty. The few miles of railway originated in Darlington have grown into the almost fabulous number of 190,700 miles in Europe and America alone. The railways in the United Kingdom to-day comprise nearly 18,000 miles, and are worked by 13,174 locomotives and 421,123 carriages and other vehicles, with an annual working expenditure of £32,045,273. They have a paid-up capital of £720,000,000 sterling, and they annually carry nearly 600,000,000 of passengers and about 220,000,000 tons of produce and merchandise, and yield a gross annual revenue of £61,776,703. In 1877 the revenue was nearly £63,000,000, and it has increased 50 per cent. since 1869. In Europe there are 102,700 miles of railway, viz.:—Germany, 19,000; Great Britain, 18,000; France, 17,000; Russia, 15,000; Austria, 11,500; Italy, 5,000; Spain, 3,800; Belgium, 2,400; Switzerland, 1,700; Holland, 1,300; in other States, 8,000 miles. The capital invested in these lines is about £3,000,000,000 sterling. They have indeed made rapid and unparalleled progress. In America, in face of the magnificent water communication with which nature has favoured that country, they to-day have 88,000 miles of railway opening out and developing its vast and varied resources. On that continent they may be said to connect the Atlantic with the Pacific. Our railways know no boundaries; they span the mighty chasm, and cross the broad expansive river; they penetrate to the interior of the earth and climb to the summit of mountains; indeed the haunts of the locomotive are in every direction. It annihilates distance. It has already disturbed the peaceful seclusion of the Mormon settlers in Utah and Salt Lake City, and it carries the hopeful adventurer over the gorges of the Yosemite Valley to the rich gold-fields of California. The railway navvy is already at work in China, but the future of the enterprise in that populous country I dare not anticipate. Railways are rapidly extending in all our colonies. They are working at the Antipodes. A line is projected through the Euphrates Valley, and it may yet be the lot of some of us to hear the shrill shriek of the locomotive as it breaks the sacred silence of the Holy Land. Railways will yet be the mode of carrying Orientalists to Jerusalem and Babylon, and conveying the Antiquary to the ruins of Nineveh. Only in to-day's paper I read of a proposed horse railway from Jerusalem to the Mount of Olives. Nothing has contributed more to the material and industrial prosperity of our own country than our improved means of communication; and I think I may truly say it is an enterprise that has been extended far beyond our shores, and by the innumerable benefits it confers upon us, by the many opportunities it affords us of visiting places otherwise excluded from us, or only accessible by very difficult and expensive means, by making us better acquainted with the condition

Monument to George Stephenson in Newcastle-upon-Tyne.